Chickenpox and Shingles

(Chickenpox is also known as varicella.
Shingles is also known as herpes zoster.)

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per NJAC 8:57, health care providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of chickenpox to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml

If the health officer is unavailable, the health care provider or administrator shall make the report to the Department by telephone to 609.588.7500, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.

CDS
Communicable Disease Service

NEW JERSEY DEPARTMENT of HEALTH and SENIOR SERVICES

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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Chickenpox and shingles are caused by varicella zoster virus (VZV), a DNA virus belonging to the herpesvirus group. Primary infection with VZV causes **chickenpox.** Like other herpes viruses, VZV has the capacity to persist in the body as a latent infection after the primary infection. **Shingles**, also known as herpes zoster, results from reactivation of the latent infection.

B. Clinical Description

Chickenpox is characterized by a pruritic (itchy), maculopapular vesicular rash that evolves into dried crusts over a five- to six-day period. Rash progression typically begins on the head, spreads down the trunk, and then to extremities with the highest concentration of lesions usually present on the trunk. All three types of lesions (macules, papules, and vesicles) are present at the same time, and they tend to be more abundant on covered parts of the body and can also occur on mucosal surfaces. Successive crops appear over several days, with lesions present in several stages of development. Healthy children usually have 200 to 500 lesions in two to four successive crops. Fever and constitutional symptoms precede the rash by one to three days. Mild, atypical, and inapparent infections occur. The disease is usually mild among children, and can be more severe in adolescents and adults. Immunity following varicella infection is considered to be long-lasting. Symptomatic reinfection is rare in healthy persons, although asymptomatic reinfection does occur.

Varicella severity and complications are increased among immunocompromised persons, pregnant women, children younger than one year of age, and adults. However, healthy children and adults may also develop serious complications and even die from varicella. Complications include pneumonia (viral and bacterial), secondary bacterial infections, thrombocytopenia, arthritis, hepatitis, encephalitis or meningitis, glomerulonephritis, and death (1 per 100,000 children aged five to nine years with varicella; 1 per 5,000 adults). Invasive group A streptococcal disease has been reported increasingly as a complication and can result in cellulitis, necrotizing fasciitis, septicemia, and toxic shock syndrome. While pneumonia is unusual in healthy children, it is the most common complication in adolescents and adults.

Congenital varicella syndrome, characterized by hypoplasia of an extremity, skin abnormalities, encephalitis, microcephaly, ocular abnormalities, mental retardation, and low birth weight, may occur among 0.4% to 2.0% of infants born to women infected with varicella during the first or second trimester of pregnancy. Infants born to women who develop varicella within the period of five days before to two days after delivery are at risk of neonatal varicella, which may be severe or even fatal.

In vaccinated persons who develop varicella more than 42 days after vaccination (breakthrough disease), the disease is almost always mild with fewer than 50 skin lesions and shorter duration of illness. The rash may also be atypical in appearance (maculopapular with few or no vesicles). Persons with breakthrough cases are also less likely to have fever and more likely to have fewer days of illness.

VZV remains in a latent state in human nerve tissue and reactivates in approximately 15% to 30% of infected persons during their lifetime, resulting in herpes zoster (shingles). Shingles usually presents as a vesicular rash with pain and itching in a dermatomal distribution. Postherpetic neuralgia, which may last for weeks to months, is defined as pain that persists after resolution of the zoster rash. Ocular nerve and other organ involvement with zoster can occur, often with severe sequelae. Shingles incidence increases with age, especially after age 50, and is more common among immunocompromised persons and among children with a history of intrauterine varicella or varicella occurring within the first year of life; the latter have increased risk of developing shingles at an earlier age.

C. Reservoirs

Humans are the only host.

D. Modes of Transmission

VZV is most commonly transmitted person-to-person from infected respiratory tract secretions. Transmission may also occur by respiratory contact with airborne droplets or by direct contact or inhalation of aerosols from vesicular fluid of skin lesions of acute varicella or zoster.

Chickenpox is highly infectious, with secondary infection rates in susceptible household contacts approaching 90%. Exposure to chickenpox does NOT cause shingles. Exposure to shingles can result in chickenpox in a susceptible person, but CANNOT cause shingles.

E. Incubation Period

The incubation period for **chickenpox** is usually 14 to 16 days, with a range of 10 to 21 days. This period may be prolonged for as long as 28 days by use of varicella zoster immune globulin (VZIG). The incubation period may be altered in immunocompromised individuals. **Shingles** has no incubation period; it is caused by reactivation of latent infection from primary chickenpox disease.

F. Period of Communicability or Infectious Period

The infectious period for **chickenpox** extends from one to two days before the onset of rash through the first four to five days, or until lesions have formed crusts. Contagiousness may be prolonged in immunocompromised patients. The infectious period for **shingles** is until all lesions have crusted over.

Calculating the Period of Infectivity

Onset date of chickenpox lesions/rash _____/_____/_____

Infectivity Period: _____/_____/_____ (Two days before onset of chickenpox lesions/rash) **TO** _____/_____/_____ (Five days after onset of chickenpox lesions/rash)

G. Epidemiology

Chickenpox occurs worldwide. In temperate climates in the prevaccine era, varicella was a childhood disease with a marked seasonal distribution with peak incidence during late winter and early spring. In the United States, incidence is highest between March and May, and lowest between September and November. In tropical climates, the epidemiology of varicella is different; acquisition of disease occurs at later ages, resulting in a higher proportion of adults being susceptible to varicella compared with adults in temperate climates. In the prevaccine era, most cases of varicella in the United States occurred in children younger than ten years of age.

Varicella vaccine was licensed in 1995. Two doses are recommended for use, with the first dose given to infants 12 to 15 months of age and the second dose to children four to six years of age. In accordance with N.J.A.C. 8:57 – 4, *Immunization of Pupils in Schools,* every child born on or after January 1998 shall have received one dose of varicella vaccine administered on or after the first birthday prior to school entrance for the first time into a Kindergarten, Grade 1 or comparable entry level special education program with an unassigned grade. Every child 19 months of age enrolling in or attending a child care center or preschool shall have at least one dose of varicella vaccine administered on or after the first birthday. New Jersey requires only one dose of the varicella vaccine and recommends the second dose. Changes in the epidemiology of chickenpox are anticipated as an increasing proportion of children in the United States become protected by vaccination. Although increased vaccination of children has lowered the overall burden of disease, a higher proportion of the cases will occur among older children, adolescents, and adults who may have escaped varicella disease or vaccination. As vaccination rates have increased, the majority of varicella cases now occur as breakthrough cases among vaccinated persons.

Shingles is found worldwide and has no seasonal variation. The most striking feature in the epidemiology of shingles is the increase in incidence found with increasing age. Approximately 20% of the general population will experience shingles during their lifetime. **Herpes zoster** (**shingles**) is a nonreportable disease/condition in New Jersey.

H. Bioterrorist Potential

Varicella and **Herpes zoster** (**shingles**) are not considered potential bioterrorist agents.

2 CASE DEFINITION

A. New Jersey Department of Health and Senior Services Case Definition

Case definition for varicella as approved by the Council of State and Territorial Epidemiologists and published in 1999 at http://www.cdc.gov/ncphi/disss/nndss/casedef/varicella_current.htm.

B. Clinical Case Description/Definition

An illness with acute onset of diffuse (generalized) maculopapulovesicular rash without other apparent cause.

C. Laboratory Criteria for Diagnosis

Laboratory diagnosis of varicella is established by

- Isolation of varicella-zoster virus from a clinical specimen, OR
- Direct fluorescent antibody (DFA), OR
- Polymerase chain reaction (PCR), OR
- Four-fold or greater rise in serum varicella immunoglobulin G (IgG) antibody level by any standard serologic assay between acute and convalescent serum specimens, OR
- Positive serologic test for varicella-zoster **capture** immunoglobulin M (IgM), performed only by CDC.

For both unvaccinated and vaccinated persons, DNA detection methods (PCR, DFA) and culture are the methods of choice for laboratory confirmation. Of these, PCR is the most reliable method for confirming infection.

D. Case Classification

CONFIRMED
A case that meets the clinical case definition AND is laboratory-confirmed or is epidemiologically linked to a confirmed or probable case

PROBABLE
A case that meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to another probable or confirmed case

NOTE: Two probable cases that are epidemiologically linked would both be considered confirmed, even in the absence of laboratory confirmation.

3 LABORATORY TESTING AVAILABLE

A. Chickenpox

Laboratory diagnosis of varicella is not routinely required but may be useful in special circumstances, such as cases of atypical clinical presentation or severe disease, ruling out variola, cases of certain adverse experiences after vaccination, when transmission of vaccine strain is suspected, or unusual outbreaks. Immunity testing of exposed contacts is not routinely recommended, although it may be recommended in certain circumstances (e.g., for pregnant women and other high-risk contacts, and in healthcare settings or outbreaks).

Isolation of VZV from a clinical specimen, or DFA, or PCR, or significant rise in serum varicella IgG antibody level by any standard serologic assay establishes a laboratory diagnosis of varicella (chickenpox). However, laboratory confirmation of cases of varicella is not routinely recommended.

1. Serological Testing

Serologic tests are available for confirmation of disease. They include capture IgM or four-fold rise from acute- and convalescent-phase IgG antibodies to VZV. The Centers for Disease Control and Prevention (CDC) do not recommend using commercial testing kits for IgM antibody because available methods lack sensitivity and specificity. False-positive IgM results are common in the presence of high IgG levels.

Diagnostic **tests for recent chickenpox infection** include viral tests such as rapid VZV identification by DFA, viral culture, viral strain identification (e.g., PCR), paired acute/convalescent serologic testing for IgG to VZV (the acute serum should be collected within 7 to 10 days of rash onset, the convalescent at least 7 to 14 days [preferably 2 to 3 weeks] later), and IgM capture enzyme-linked immunosorbent assay (ELISA).

2. Viral Isolation and Identification

The preferred diagnostic tests to confirm varicella infection include virus isolation and identification.

Diagnostic **tests for immunity** include the following serologic tests: ELISA, latex agglutination (LA), IFA, fluorescent antibody to membrane antigen, radioimmunoassay, and complement fixation. Latex agglutination can be done quickly and may be the most useful postexposure test.

3. Special Situations Where Additional Testing May Be Indicated

The New Jersey Department of Health and Social Services (NJDHSS) Public Health Environmental Laboratories (PHEL) does not normally test for varicella immunity or current infection. Consultation with the NJDHSS Immunization Program is required before testing is

initiated for the following rare and unusual circumstances listed below which may be considered:

- "Breakthrough" varicella in vaccinated individuals
- Postvaccination events. Examples: (a) rash with more than 50 lesions 7 to 42 days postvaccination; (b) suspected secondary transmission of the vaccine virus; (c) herpes zoster; and (d) any serious adverse event (e.g., pneumonia, encephalitis, cerebral ataxia).
- Varicella reinfections in unvaccinated individuals
- Atypical varicella both mild and severe
- Serologic testing in those with uncertain histories of varicella. Only under special circumstances, including certain outbreaks, will the PHEL, in consultation with the VPDP program, consider performing immunity testing or arrange for immunity testing to be done at the CDC in adolescents and adults with a negative or uncertain history of varicella.

B. Shingles

Laboratory confirmation is not usually indicated. Serologic testing is not helpful. Immunity testing of exposed contacts is not routinely recommended, although it may be recommended in certain circumstances (e.g., for pregnant women and other high-risk contacts, and in healthcare settings).

4 PURPOSE OF SURVEILLANCE AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

- To monitor the impact over time of the vaccination program on age-specific incidence and severity of chickenpox
- To evaluate vaccine efficacy under conditions of routine use and track instances of vaccine failure
- To identify groups and areas in which risk of disease is highest so prevention and control efforts can be focused
- To track and minimize the occurrence of infectious complications such as invasive group A streptococcal infection

NOTE: Currently, NJDHSS does not require reporting of shingles cases.

B. Laboratory Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1) stipulates that laboratories shall report any positive result within 72 hours, by telephone, any positive culture, test, or assay result specific to varicella to the local health department (LHD) where the patient resides. If the

laboratory director or his/her designee is unable to reach the LHD where the patient resides, he/she should report the result to NJDHSS VPDP at 609.588.7512 (nonholiday weekdays between 8 a.m. and 5 p.m.) or 609.392.2020 (nights/weekends/holidays). Telephone reports shall be followed by a report via confidential fax, over the Internet using the Communicable Disease Reporting and Surveillance System (CDRSS), or in writing to the health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. Please refer to the lists of reportable diseases (http://www.state.nj.us/health/cd/njac857.pdf) for information.

C. Healthcare Provider Reporting Requirements

As specified at NJAC 8:57-1, any healthcare provider shall report within 24 hours by telephone confirmed or suspect cases of varicella. Telephone reports to the LHD where the patient resides shall be followed by a report (in writing, via confidential fax, or using CDRSS) to the health officer of the jurisdiction in which the patient lives or, if unknown, wherein the diagnosis is made. If the health officer is unavailable, the report shall be made to NJDHSS VPDP at 609.588.7512 (nonholiday weekdays between 8 a.m. and 5 p.m.) or 609.392.2020 (nights/weekends/holidays).

D. Health Officer Reporting and Follow-up Responsibilities

As specified at NJAC 8:57-1 each local health officer notified of varicella must report the occurrence of any case or outbreak of varicella to NJDHSS VPDP within 24 hours of receiving the report. The health officer shall within 24 hours of receipt of a report initiate or update the information on CDRSS. If the initial report is incomplete, a health officer shall seek complete information and provide all available information to NJDHSS VPDP within five days of receiving the initial report. Refer to the health officer's Reporting Timeline (http://www.state.nj.us/health/cd/njac857.pdf) for information on prioritization and timeliness requirements of reporting and case investigation.

NOTE: Please note that deaths, where chickenpox was a contributing factor, should be reported to NJDHSS.

5 CASE INVESTIGATION

- It is the health officer's responsibility to investigate the case by interviewing the patient and others who may be able to provide pertinent information.
- Following notification, the local health officer shall complete a Varicella Case Report (IMM-5) on all suspected or confirmed cases (Exhibit I) and initiate or update the case in CDRSS.
- Document information about
    - Clinical symptoms, including severity of rash
    - Date of onset of symptoms
    - Varicella immunization history
    - Recent history of travel (to where and dates)
    - Recent out-of-town visitors (from where and dates)
    - Recent contact with anyone with similar symptoms
    - Country of birth, age, sex, county, length of time in the United States
    - Possible transmission setting (e.g., children, school, healthcare setting)
    - Risk factors for disease
- After completing the IMM-5 send to NJDHSS VPDP, PO Box 369, Trenton, NJ 08625-0369, or fax to 609.588.3642.
- Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand and, if necessary and approved by NJDHSS, institute control guidelines listed below in section 6.

A. Entry into CDRSS

The mandatory fields in CDRSS include disease, last name, county, municipality, gender, race, ethnicity, case status, and report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of varicella cases. The "Tab" column includes the tabs that appear along the top of the CDRSS screen. The "Required Information" column provides detailed explanations of what data should be entered.

CDRSS Screen	Required Information
Patient Info	Enter the disease name ("VARICELLA (CHICKENPOX)"), patient demographic information, illness onset date, and the date the case was reported to the LHD. There are no subgroups for varicella. In the Demographics section, indicate residency status. For non-U.S. residents, indicate country of origin and date of arrival.

CDRSS Screen	Required Information
Addresses	Enter any alternate address (e.g., a daycare or school address). Use the Comments section in this screen to record any pertinent information about the alternate address (e.g., the times per week the case-patient attends day care or school). Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
Clinical Status	Enter any treatment that the patient received and record the names of the medical facilities and physician(s) involved in the patient's care. If the patient received care from two or more hospitals, be sure that all are entered so the case can be accessed by all infection control professionals (ICPs) covering these facilities. Indicate pregnancy status under the Clinical Status section. If immunization status is known, it should also be entered in the Immunizations section. If the patient died, date of death should be recorded under the Mortality section.
Signs/Symptoms	Check appropriate boxes for signs and symptoms and indicate their onset. Make every effort to get complete information by interviewing the physician, family members, ICP, or others who might have knowledge of the patient's illness. Also, information regarding the resolution of signs and symptoms should be entered.
Risk Factors	Enter complete information about risk factors to facilitate study of varicella disease in New Jersey.
Laboratory Eval	Select "CULTURE FOR VARICELLA" if culture of a normally sterile site (e.g., vesicular fluid, blood, cerebrospinal fluid) was performed. Select "VARICELLA PCR" if a PCR test was performed. **NOTE:** Serologic testing is not adequate for case confirmation unless it is paired acute- and convalescent- phase antibody tests (see case definition in section 2). Specimen type, specimen collection date, test result, and, if applicable, test value should also be recorded. Antimicrobial susceptibility testing results should be documented in the Comments section.
Contact Tracing	Information regarding contacts is required for this disease including information on any household and other close contacts. Identify susceptible high-risk contacts (e.g., pregnant women, immunocompromised or unvaccinated persons, infants under 12 months of age). Document any vaccine or travel history of contacts in the Comments section.

CDRSS Screen	Required Information
Case Comments	Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the Comments section. **NOTE:** Select pieces of information entered in the Comments section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.
Epidemiology	Indicate method of import and method of case detection in the Epidemiology section. Under the Other Control Measures section, indicate if the patient falls into any of the categories listed under Patient Role(s)/Function(s) (e.g., "DAYCARE ATTENDEE," "DAYCARE PROVIDER," "HEALTHCARE WORKER"). Record name of and contact information for case investigators from other agencies (e.g., CDC, out-of-state health departments). Document communication between investigators in the Comments section.
Case Classification Report Status	Case status options are "REPORT UNDER INVESTIGATION (RUI)," "CONFIRMED," "PROBABLE," "POSSIBLE," and "NOT A CASE." • All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of "REPORT UNDER INVESTIGATION (RUI)." • Cases still under investigation by the LHD should be assigned a case status of "REPORT UNDER INVESTIGATION (RUI)." • Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. "CONFIRMED," "PROBABLE," and "NOT A CASE" are the only appropriate options for classifying a case of varicella (see section 2). Report status options are "PENDING," "LHD OPEN," "LHD REVIEW," "LHD CLOSED," "DELETE," "REOPENED," "DHSS OPEN," "DHSS REVIEW," and "DHSS APPROVED." • Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of "PENDING." • Once the LHD begins investigating a case, the report status should be changed to "LHD OPEN." • The "LHD REVIEW" option can be used if the LHD has a

CDRSS Screen	Required Information
	person who reviews the case before it is closed (e.g., health officer or director of nursing). • Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to "LHD CLOSED." • "LHD CLOSED" cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to "REOPENED" and the LHD will be notified by e-mail. Cases that are "DHSS APPROVED" cannot be edited by LHD staff. If a case is inappropriately entered (e.g., a case of rubella was erroneously entered as a case of varicella) the case should be assigned a report status of "DELETE." A report status of "DELETE" should NOT be used if a reported case of varicella simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.

6 CONTROLLING FURTHER SPREAD OF CHICKENPOX

This section provides detailed control guidelines that are an integral part of case investigation. LHDs should familiarize themselves with the information. However, NJDHSS VPDP will coordinate the implementation of any control measures in collaboration with the LHD or other state institution.

NOTE: For specific guidelines on controlling chickenpox spread from *shingles*, see section 7 below.

A. Isolation and Quarantine Requirements (NJAC 1-1.2)

NJDHSS VPDP should be notified for consultation and approval before any institutional, exclusion, or community-wide outbreak control measures are planned or implemented. Generally, outbreak control measures are not necessary in response to a sporadic case.

1. Minimum Period of Isolation of Patient

Until lesions have dried and crusted, or until no new lesions appear within a 24-hour period; usually by the fifth day.

2. Minimum Period of Quarantine of Contacts

Neonates born to mothers with active varicella should be isolated from susceptibles and suspected susceptibles until 21 days of age. Healthcare workers shall be excluded from their occupations from the 8th through 21st days after their last exposure if they are susceptible. Anyone receiving VZIG shall extend their exclusion to 28 days postexposure. Otherwise, no restrictions.

B. Protection of Contacts of a Case

1. **Rule out vaccine reaction as the cause of rash.** Ask about previous varicella vaccination and any recent exposure to chickenpox or shingles. A mild rash occurs in 1% to 5% of recipients of varicella vaccine, typically one to three weeks after vaccination. It is only rarely thought to be infectious. For help distinguishing wild-type disease and breakthrough chickenpox from vaccine reaction, see Attachment A: Guidelines for Evaluating Chickenpox-like Rash in Recipients of Varicella Vaccine (at the end of this chapter), which are applicable to a variety of settings, including day care and school. ("Breakthrough" chickenpox is a less severe form of wild-type disease that can occur in approximately 1% of people vaccinated each year who developed partial immunity.)

2. **Isolate the case** until all lesions have crusted over, usually by the fifth day after rash onset but sometimes longer in immunocompromised patients.

- *Salicylates:* Children (≤18 years of age) with chickenpox should NOT receive salicylates (aspirin products) because they are associated with an increased risk of Reye syndrome. Acetaminophen may be used for control of fever.
- *Antivirals:* Varicella and zoster may be treated with antiviral agents such as acyclovir or valacyclovir. The decision to use therapy and the duration and route of therapy should be determined by specific host factors, extent of infection, and initial response to therapy as determined by the personal physician of the affected person.

NOTE: Oral acyclovir is NOT recommended for routine use in otherwise healthy children with varicella.

3. **Consider need to identify and contact all those exposed.** When practical, a healthcare provider or public health authority may desire to inform those in contact with cases of their exposure. In general, public health epidemiologic case investigation and outbreak control measures around an isolated case or cluster is not deemed necessary. "Exposure" to chickenpox is defined as contact with nasopharyngeal secretions or lesions, face-to-face interaction, or sharing indoor airspace with an infectious person (e.g., occupying the same classroom, the same two- to four-bed ward, or adjacent beds in a large ward). Consider members of the following groups who may have been in contact with the case during his/her infectious period:

- Household members

- School/day-care students and staff (consider interaction patterns, staffing patterns, and possibilities of shared airspace, face-to-face contact, and saliva exchange)
- Staff and patients of healthcare facilities (see Healthcare settings, Section 6C.2)
- Workplace contacts (especially in day-care, school, and healthcare settings – see Section 6C)
- Social and religious groups
- Sports teams and extracurricular groups
- Bus/carpool mates
- Close friends
- Persons potentially exposed at social events or travel sites

4. **Identify high-risk susceptibles among the exposed.** Susceptibles are those without proof of immunity as defined below.

Proof of Immunity to Varicella[1]

- Documentation of age-appropriate vaccination
  - Preschool-aged children 12 months of age or older: one dose
  - School-aged children, adolescents, and adults: two doses
  - For children younger than 13 years of age, the minimum interval between doses is three months.

  However, if the child received the first dose before age 13 years and the interval between doses was at least 28 days, the second dose is considered valid.
- Laboratory evidence of immunity or laboratory confirmation of disease
- Born in the United States before 1980
  - For healthcare workers and pregnant women, birth before 1980 should not be considered evidence of immunity.
- A healthcare provider diagnosis of varicella or verification of history of varicella disease
- History of herpes zoster based on healthcare provider diagnosis.

[1]Bone marrow transplant recipients should be considered susceptible *regardless* of past history of disease.

- **Immunocompromised individuals** identified as exposed should be advised to consult their healthcare provider. These individuals have a higher risk of serious complications with chickenpox infection, including disseminated disease, resulting in multiple organ system involvement. Frequent complications include pneumonia and encephalitis. Immunocompromised persons (including HIV-infected persons) should receive VZIG as soon as possible if within 96 hours of exposure.
- **Susceptible pregnant women** identified as exposed should be advised to consult their obstetrician. These women may be at higher risk for serious complications than adults in general, and their fetuses are at risk for congenital varicella syndrome. Hence, VZIG is indicated for these women as soon as possible if within 96 hours of exposure. Whether the fetus is protected by VZIG is unknown.
- **Newborns** should receive VZIG (125 U) as soon as possible if within 96 hours of exposure:

- Newborns whose mothers' onset of chickenpox occurred within the period of five days before delivery to two days after delivery should receive VZIG (125 U) as soon as possible after delivery.
- Exposed hospitalized premature infants (≥ 28 weeks gestation) whose mothers have no history of chickenpox or serologic proof of immunity should receive VZIG.
- Exposed hospitalized premature infants (< 28 weeks of gestation or ≤ 1,000 g), regardless of maternal history, should receive VZIG.
- For healthy, full-term infants exposed postnatally to chickenpox (except those whose mothers' rash developed between five days before delivery and two days after delivery), VZIG is NOT indicated, although it MAY be considered, depending on age and mother's immune status. The package insert should be consulted.

Notes on prophylaxis:

a) The recommended dosage of VZIG is 125 U per 10 kg given intramuscularly (min. 125 U, max. 625 U). Depending on the volume required, it may need to be given in divided doses. Please refer to the package insert.
b) If an individual has received VZIG or IVIG (400 mg/kg) two or fewer weeks after exposure, NO additional immunoprophylaxis is necessary.
c) Receipt of varicella and MMR vaccines must be deferred for five or more months after receipt of VZIG. Please refer to Attachment B (at the end of this chapter).
d) Postexposure use of acyclovir may be a less costly alternative or adjunct to the use of VZIG in some susceptible persons. However, additional data are needed concerning its prophylactic use in healthy and immunocompromised persons in all age groups.

5. **Recommend the exclusion of high-risk susceptible contacts** until one incubation period (21 days) after their last exposure (for their own protection) or, if they receive VZIG, 28 days after their last exposure (for the protection of others). After this time, they may return if no additional cases have been identified. If a healthcare setting is involved, see Section 6C.2 below

6. **Identify and vaccinate other exposed susceptibles.** Susceptibles are those with no reliable history of chickenpox or shingles, documentation of prior vaccination against chickenpox, or serologic proof of immunity. See Attachment B (located at end of this chapter) for information about some groups who should NOT receive varicella vaccine.

After consultation with NJDHSS, consider recommending varicella vaccine to eligible, susceptible individuals exposed in institutional settings (e.g., day-care centers, schools, healthcare settings) and advising them to contact their private physicians for guidance and possible vaccination services.

- Varicella vaccine can prevent or modify disease if given within three days, and possibly up to five days, after exposure.
- Vaccinating someone who is incubating chickenpox or is immune is not harmful.
- If vaccine is given following exposure, parents and others should be informed that chickenpox could occur in spite of vaccination.

7. **Supply potentially exposed individuals with information.** In institutional settings experiencing an outbreak, including day-care centers and schools, (a) provide potentially exposed attendees (or their parents) and staff with written or verbal notice of the outbreak and a letter encouraging parents to consult their regular medical provider to consider vaccination, if unvaccinated, and (b) have staff instruct their affected population on recommended infection control practices such as the importance of careful hand-washing, especially after touching discharges from nose, throat, or chickenpox lesions, and the importance of not sharing eating utensils or toys that are put into the mouth.

8. **Continue monitoring a chickenpox outbreak for 21 days** (one incubation period) after the last exposure to chickenpox. For those who received VZIG and where immunocompromised individuals are involved, surveillance should continue for **28 days**.

C. Managing Special Situations

1. Institutional settings where group A streptococcal infection is also present

Invasive group A streptococcal (GAS) infections as a complication following chickenpox are becoming more common. NJDHSS has detailed control measures for day-care centers and schools where varicella is accompanied by GAS, whether invasive or noninvasive. The central strategy involves rapid vaccination of exposed susceptibles—varicella vaccine can prevent or modify disease if given within three days, and possibly up to five days, after exposure—with antibiotic treatment where indicated. **Contact the Infectious and Zoonotic Diseases Program for assistance at 609.588.7500 for consultation.** Also, refer to the "Group A Streptococcus (Invasive)" chapter in this manual for more information about this infection.

2. Healthcare settings (including acute and long-term care facilities)

All susceptible healthcare workers should ensure that they are immune to chickenpox. Immunization is particularly important for susceptible healthcare workers who have close contact with persons at high risk for serious complications, including (a) premature infants born to susceptible mothers, (b) premature infants who are born at less than 28 weeks of gestation or who weigh 1,000 g or less at birth (regardless of maternal immune status), (c) pregnant women, and (d) immunocompromised individuals. Healthy adolescents and adults are also at higher risk for complications and healthy, full-term newborns born to susceptible mothers may be as well.

In healthcare institutions, serologic screening of personnel who have a negative or uncertain history of chickenpox before vaccinating is likely to be reliable and cost-effective. Routine testing for chickenpox immunity after two doses of vaccine is not necessary because 99% of adults are seropositive after the second dose. Seroconversion, however, does not always result in full protection against disease. For vaccinated healthcare workers who are subsequently exposed to chickenpox (or shingles), the following measures should be considered:

- **Test** for serologic immunity immediately after chickenpox exposure (the latex agglutination [LA]test is fast).
- **Retest** five to six days later to determine if an anamnestic response (boosting of antibody titers) is present.
- **Exclude or reassign** personnel who do not have detectable antibody.

a. **Isolate/exclude the case** until all lesions have crusted over, usually by the fifth day after rash onset but sometimes longer in immunocompromised individuals. Inpatients with varicella should be placed on airborne precautions (negative pressure room).

b. **Identify all those exposed.** "Exposure" to chickenpox is defined as contact with nasopharyngeal secretions or lesions, face-to-face interaction, or sharing indoor airspace with an infectious person (e.g., occupying the same two- to four-bed ward or adjacent beds in a large ward).

c. **Identify high-risk susceptible patients/staff among the exposed.** Refer to Section 6B.4-5 about exposed high-risk susceptible groups and use of VZIG. High-risk susceptible patients/staff exposed to a case of chickenpox (or shingles) should receive VZIG as soon as possible if within 96 hours of exposure.

NOTE: VZIG is available only from the American Red Cross offices throughout the United States and costs approximately $400-500 for an adult dose. The private physician or institution is responsible for purchasing it commercially by calling 1.800.261.5772.

d. **Identify and vaccinate other exposed susceptibles.** Susceptibles are those without a reliable history of chickenpox or shingles, documentation of prior vaccination against chickenpox, or serologic proof of immunity. See Attachment C for information about some groups who should NOT receive varicella vaccine. Recommend varicella vaccine to eligible, susceptible exposed staff/patients. **Varicella vaccine can prevent or modify disease if given within three days after exposure.** Vaccinating someone who is incubating chickenpox or is immune is not harmful. If vaccine is given following exposure, recipients should be informed that chickenpox could occur in spite of vaccination.

e. **Discharge or isolate exposed susceptible patients.** Discharge all exposed, susceptible patients as soon as possible. Isolate on airborne precautions all such patients who cannot be discharged from day 8 to day 21 after exposure. Those who have received VZIG must remain in isolation until day 28. Newborns born to mothers with active chickenpox should be isolated from susceptibles until 21 days of age if they do not receive VZIG or until 28 days of age if they do.

f. **Exclude exposed susceptible healthcare personnel.** Decisions about excluding exposed susceptible staff will depend on such factors as the setting (e.g., neonatal unit vs. long-term care facility for elderly), degree of direct patient contact, and whether or not the staff person received vaccine within three days of exposure. The recommendation to use vaccine as postexposure prophylaxis is recent (1999) and there is not much experience

with its use in high-risk settings. The NJDHSS recommendation is to exclude all exposed susceptible staff from direct patient contact and possibly from the entire workplace from day 8 to day 21 after exposure. Exclusion of VZIG recipients should be extended to 28 days after exposure.

g. **Consider testing exposed immunized staff.** After receiving two doses of varicella vaccine, 99% of adults are seropositive. However, since seroconversion does not always result in complete protection against disease, testing vaccine recipients for seropositivity through a commercial laboratory immediately after exposure and retesting five to six days later for an anamnestic response is a potentially effective strategy for identifying those who remain at risk for varicella.

h. **Conduct surveillance for chickenpox for 21 days** (one incubation period) after the last exposure to chickenpox. For those who received VZIG and where immunocompromised individuals are involved, surveillance should continue for 28 days.

7 CONTROLLING CHICKENPOX SPREAD FROM SHINGLES

A. Isolation and Quarantine Requirements — Shingles

There are no isolation or quarantine requirements for shingles.

B. Protection of Contacts of a Case of Shingles

In their lesions, individuals with shingles carry and shed the virus that causes chickenpox. Therefore, persons with shingles must be very careful about personal hygiene and wash their hands if they touch their lesions. In otherwise healthy individuals, lesions that are covered appear to pose little risk to susceptible individuals. Unless the shingles rash can be completely covered, it is advisable that individuals with shingles stay home until the rash is crusted over and dry. Children with shingles whose lesions cannot be covered should be excluded from day care/school until their lesions have crusted.

Those with disseminated shingles and immunocompromised people with either localized or disseminated shingles can transmit chickenpox virus via the airborne route and should stay home or, if in the hospital, on airborne and standard precautions for the duration of the illness.

“Exposure” to uncomplicated shingles is defined as contact with lesions; for example, through close patient care, touching, or hugging. “Exposure” to disseminated shingles and localized or disseminated shingles in an immunocompromised person is defined as (a) contact with lesions; for example, through close patient care, touching, or hugging, or (b) sharing indoor airspace (e.g., occupying the same two- to four-bed ward or adjacent beds in a large ward).

Control measures are the same as for chickenpox in Section 6B.3–8 and include vaccination of eligible, susceptible contacts.

C. Managing Shingles in Healthcare Settings (including acute and long-term care facilities)

All susceptible healthcare workers should ensure that they are immune to chickenpox. Immunization is particularly important for susceptible healthcare workers who have close contact with persons at high risk for serious complications, including (a) premature infants born to susceptible mothers, (b) premature infants who are born at less than 28 weeks of gestation or who weigh 1,000 g or more at birth (regardless of maternal immune status), (c) pregnant women, and (d) immunocompromised individuals. Healthy adolescents and adults are also at higher risk for complications and healthy, full-term newborns born to susceptible mothers may be as well.

In healthcare institutions, serologic screening of personnel who have a negative or uncertain history of chickenpox before vaccinating is likely to be reliable and cost-effective. Routine testing for chickenpox immunity after two doses of vaccine is not necessary because 99% of adults are seropositive after the second dose. Seroconversion, however, does not always result in full protection against disease. For vaccinated healthcare workers who are subsequently exposed to shingles (or chickenpox), the following measures should be considered:

- **Test** for serologic immunity immediately after chickenpox exposure (the latex agglutination [LA] test is fast)
- **Retest** five to six days later to determine if an anamnestic response (boosting of antibody titers) is present
- **Exclude or reassign** personnel who do not have detectable antibody.

1. Prevent exposure to the case, as follows:

Staff

- **Staff with localized shingles** should cover lesions and should not care for high-risk patients until their skin lesions have become dry and crusted.
- **Staff with disseminated shingles and immunocompromised staff with shingles** should be excluded for the duration of their illness.

Patients

- **Patients with localized shingles** should be cared for using standard precautions (including but not limited to hand-washing, gloves, masks, and eye protection during activities likely to generate splashes, nonsterile gowns) until all lesions are crusted. Current or prospective roommates should be immune or get vaccinated.
- **Patients with disseminated shingles and immunocompromised patients with shingles** (either localized or disseminated) require airborne and contact precautions for the duration of the illness.

2. **Identify all those exposed.**

- "Exposure" to uncomplicated shingles is defined as contact with lesions, such as through close patient care, touching, or hugging.
- "Exposure" to disseminated shingles and localized or disseminated shingles in an immunocompromised person is defined as (a) contact with lesions, such as through close patient care, touching, or hugging, or (b) sharing indoor airspace with the infectious person (e.g., occupying the same two- to four-bed ward or adjacent beds in a large ward).

3. **Identify high-risk susceptible patients/staff among the exposed.** Refer to Section 6B.4–5, about exposed high-risk susceptible groups and use of VZIG. High-risk susceptible patients/staff exposed to a case of shingles (or chickenpox) should receive VZIG as soon as possible if within 96 hours of exposure.

4. **Identify and vaccinate other exposed susceptibles.** Susceptibles are those without a reliable history of chickenpox or shingles, documentation of prior vaccination against chickenpox, and serologic proof of immunity. See Attachment B (at end of this chapter) for information about some groups who should NOT receive varicella vaccine. Recommend varicella vaccine to eligible, susceptible, exposed staff/patients. **Varicella vaccine can prevent or modify disease if given within three days, and possibly up to five days, after exposure.** Vaccinating someone who is incubating chickenpox or is immune is not harmful. If vaccine is given following exposure, recipients should be informed that chickenpox could occur in spite of vaccination.

5. **Discharge or isolate exposed susceptible patients.** Discharge all exposed, susceptible patients as soon as possible. Isolate on airborne precautions all such patients who cannot be discharged from day 8 to day 21 after exposure. Those who have received VZIG must remain in isolation until day 28. Newborns exposed to shingles should be isolated from susceptibles until 21 days of age if they do not receive VZIG or until 28 days of age if they do.

6. **Exclude exposed susceptible healthcare personnel.** Decisions about excluding exposed susceptible staff will depend on such factors as the setting (e.g., neonatal unit versus long-term care facility for elderly), degree of direct patient contact, and whether or not the staff person received vaccine within three days of exposure. The recommendation to use vaccine as postexposure prophylaxis is recent (1999) and there is not much experience with its use in high-risk settings. The NJDHSS recommendation is to exclude all exposed susceptible staff from direct patient contact and possibly from the entire workplace from day 8 to day 21 after exposure. Exclusion of VZIG recipients should be extended to 28 days after exposure.

7. **Consider testing exposed immunized staff.** After receiving two doses of varicella vaccine, 99% of adults are seropositive. However, since seroconversion does not always result in complete protection against disease, testing vaccine recipients for seropositivity through a commercial laboratory immediately after exposure and retesting five to six days later for an anamnestic response is a potentially effective strategy for identifying those who remain at risk for varicella.

8. **Conduct surveillance for chickenpox for 21 days (one incubation period) after the last exposure to shingles.** For those who received VZIG and where immunocompromised individuals are involved, surveillance should continue for **28 days.**

D. Preventive Measures

Vaccination, including routine childhood vaccination, catch-up vaccination of adolescents, and targeted vaccination of high-risk adult groups, is the best preventive measure against chickenpox and subsequent shingles. Good personal hygiene (which consists of proper hand-washing, disposal of used tissues, not sharing eating utensils, etc.) is also important. Please refer to the most current versions of the ACIP statements on varicella (listed under References, below) and other relevant resources available at various Web sites listed as references.

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Attachment A: Guidelines for Evaluating Chickenpox-like Rash in Recipients of Varicella Vaccine in Day-Care and School Settings

Attachment B: Suggested Intervals between Administration of Immunoglobulin Preparations and Measles-Containing and Varicella Vaccines

Attachment C: Special Considerations in the Administration of Varicella Vaccine

Exhibit I: Varicella Case Report, IMM-5

Attachment A

Local Health Department Guidelines for Evaluating Chickenpox-like Rash in Recipients of Varicella Vaccine in Day Care and School Settings

These guidelines assist with the evaluation of chickenpox-like rash in vaccine recipients, deciding whether or not they are infectious, and if they should be excluded from day care or school settings. The two most important features to consider in making these determinations are: 1) the severity of the chickenpox-like illness and, if pertinent, any known exposure to chickenpox, and 2) the time interval since receipt of varicella vaccine, as outlined below.

Symptoms	• **Generalized rash (typically 200->500 lesions with many vesicles)** • **Fever** • **Cough** **(if "partial" immunity has developed, symptoms may be attenuated)**	• **Generalized rash, more maculo-papular than vesicular (usually <50 lesions)** • **Often afebrile** • **Minimally symptomatic** • **Known or possible exposure to chickenpox**	• **Generalized rash, more maculopapular than vesicular (usually <20 lesions [median=5])** • **Some localized vesicles at the site of injection (median=2)** • **Afebrile** • **Asymptomatic** • **No known exposure to chickenpox**
	and	***and***	***and***
Timing Post Vaccination	**if rash occurs at anytime**	**if rash occurs at >1 week**	**if rash occurs at 1-3 weeks (typically) but can occur up to 6 weeks**
	⇓	⇓	⇓
Type of Disease	**Wild-type chickenpox** (either vaccine has not yet induced protective immunity or vaccine failure)	**Vaccine-modified varicella syndrome (VMVS or "break-through chickenpox")** (occurs in 20% and 27% of vaccinated children and adults, respectively, with household exposure to wild-type varicella)	**LIKELY TO BE SIDE EFFECT OF VACCINE** (occurs in 1-5% of vaccinees)
	⇓	⇓	⇓
Infectious?	**Highly infectious**	**Infectious**	• ***Much less* infectious than wild-type disease** • **If transmission occurs, infection may be asymptomatic or attenuated**
	⇓	⇓	⇓
Recommend Exclusion?	**Exclude from school until all lesions have dried and crusted over, or until no new lesions appear, usually by the 5th day after rash onset**	**Exclude as for wild-type chickenpox. However, lesions may crust over more quickly than in wild-type chickenpox, thereby permitting an earlier return to day care/ school.**	***If local policy permits*, the child may attend school**

[Please see the accompanying page for more details.]

Attachment A

Guidelines for Evaluating Chickenpox-like Rash in Recipients of Varicella Vaccine in Day Care and School Settings, cont.

Distinguishing rash induced by varicella vaccine virus from rash caused by wild-type virus in a vaccine recipient is critical in making appropriate community infection control decisions and patient management decisions, particularly regarding individuals at risk for serious complications of varicella. The two most important features to consider when evaluating a chickenpox-like rash in a vaccine recipient are 1) the severity of the chickenpox-like illness and, if pertinent, any known exposure to chickenpox; and 2) the time interval since receipt of varicella vaccine. The NJDHSS is providing the guidance outlined below to assist in making this determination.

There are three possible categories of chickenpox-like rash in vaccine recipients:

1. **Wild-type chickenpox (can occur at anytime post-vaccination)**:
   a) **<1 week post-vaccination** – In this case, exposure to wild-type virus happens prior to or immediately following vaccination. Wild-type chickenpox can occur in this scenario because there has been insufficient time for immunity to develop prior to exposure.
   b) **≥1 week post-vaccination** – In this case, the vaccine recipient has not responded sufficiently to the vaccine prior to exposure. The lack of vaccine-induced protection may also reflect insufficient time post-vaccination for immunity to develop; or it may be due to host- or vaccine-specific issues impairing response to vaccine ("vaccine failure").

   In **both** instances, the illness usually presents as typical chickenpox with a generalized rash with 200->500 lesions with many vesicles, fever, and cough. The patient should be **considered infectious and excluded** until the lesions dry and crust over, usually 5 days after rash onset.

2. **Vaccine-modified varicella syndrome (VMVS or "breakthrough chickenpox")** – This is a form of wild-type chickenpox that is less severe due to the development of "partial immunity" that was not sufficient to prevent disease but was able to attenuate symptoms. **It usually occurs >1 week post-vaccination**. VMVS can occur in up to 20% and 27% of vaccinated children and adults, respectively. VMVS usually presents as a generalized rash consisting of <50 lesions, usually more maculopapular, with a few vesicles. Patients are often afebrile and minimally symptomatic. Individuals with VMVS should still be **considered infectious and excluded** until the lesions dry and crust over. In this scenario, crusting over may occur more quickly than the usual 5 days after rash onset (e.g. 2-3 days after onset), facilitating an earlier return to day care/school.

3. **Vaccine-associated rash** ("side effect" from vaccine) – This is reported in 1% to 5% of vaccine recipients and **typically occurs 1-3 weeks, but is possible up to 6 weeks, post-vaccination**. It usually presents as a generalized rash, more maculopapular than vesicular, usually consisting of <20 lesions and a few vesicles at the site of injection (median = 2). Patients are afebrile and otherwise asymptomatic. If the clinical presentation fits these criteria and there is **no known exposure** to chickenpox, this rash may be related to varicella vaccination. Although there are no official guidelines, this type of rash is caused by attenuated vaccine virus, and, for this reason, many experts believe that it is **much less** infectious than disease caused by wild-type virus. If transmission of vaccine virus does occur, infection has been found to be mild or asymptomatic. Day care and school programs will need to develop their own policies on this issue. Since vaccine-associated does not pose the same public health threat as does wild-type chickenpox, NJDHSS guidelines do not recommend exclusion. However, day care and school programs may develop their own policies on this issue based on characteristics of the particular school population.

   Please note: Chickenpox-like rashes occurring during this time period may be caused by wild-type virus, particularly if there is a known or possible exposure to chickenpox or if the rash occurs during chickenpox season. (See VMVS above.)

The accompanying diagram assists in determining the nature of a post-varicella-vaccination rash and in making decisions regarding exclusion of patients from the day care/school setting. Starting at the top of the diagram: 1) find the category of symptoms that best matches the patient's and, if pertinent, any known or possible exposure history; 2) determine the timing of rash onset relative to vaccination; 3) follow the column down to determine the type of disease; 4) follow down the column further still to determine if the patient is infectious; and, finally, 5) follow down the column to determine if the patient needs to be excluded.

Attachment B

Suggested Intervals between Administration of Immunoglobulin Preparations and Measles-Containing and Varicella Vaccines

Indication	Dose (including mg IgG/kg) / Route	Suggested interval before measles or varicella vaccination (months)
Tetanus (TIG)	250 units (~10 mg IgG/kg) / IM	3
Hepatitis A (IG) Contact prophylaxis International travel	 0.02 mL/kg (3.3 mg IgG/kg) / IM 0.06 mL/kg (10 mg IgG/kg) / IM	 3 3
Hepatitis B prophylaxis (HBIG)	0.06 mL/kg (10 mg IgG/kg) / IM	3
Rabies prophylaxis (HRIG)	20 IU/kg (22 mg IgG/kg) / IM	4
Varicella prophylaxis (VZIG)	125 units/10 kg (20-40 mg IgG/kg) / IM (max. 625 units)	5
Measles prophylaxis (IG) Normal contact Immunocompromised contact	 0.25 mL/kg (40 mg IgG/kg) / IM 0.50 mL/kg (80 mg IgG/kg) / IM	 5 6
Blood transfusion Red blood cells (RBCs), washed RBCs adenine-saline added Packed RBCs (Hct 65%) Whole blood (Hct 35-50%) Plasma/platelet products	 10 mL/kg (negligible IgG/kg) / IV 10 mL/kg (10 mg IgG/kg) / IV 10 mL/kg (60 mg IgG/kg) / IV 10 mL/kg (80-100 mg IgG/kg) / IV 10 mL/kg (160 mg IgG/kg) / IV	 0 3 6 6 7
Replacement of humoral immune deficiencies (as IGIV)	300-400 mg/kg / IV (as IGIV)	8
Respiratory Syncytial Virus Prophylaxis (RSV-IGIV)	750 mg/kg / IV	9
ITP (as IGIV) ITP (as IGIV) **ITP or Kawasaki disease (as IGIV)**	400 mg/kg / IV (as IGIV) 1000 mg/kg / IV (as IGIV) 1,600 – 2,000 mg/kg / IV (as IGIV)	8 10 11

Note on other live vaccines: Blood and other antibody-containing products (except washed red blood cells) can also diminish the response to rubella vaccine, and potentially to mumps vaccine. Therefore, after immune globulin preparations or other antibody-containing products are received, mumps and rubella vaccines should be deferred for ≥ 3 months. If RSV-IGIV is given, mumps, rubella and varicella vaccines should be deferred for ≥ 9 months. If RSV-IM is given, no deferral is needed for any live virus vaccines.

Adapted from: American Academy of Pediatrics. Measles. In: Pickering LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. p. 390 and the *MMWR*, Centers for Disease Control and Prevention Recommendations and Reports: General Recommendations on Immunization, Feb 8, 2002, p.7.

Attachment C

SPECIAL CONSIDERATIONS IN THE ADMINISTRATION OF VARICELLA VACCINE

1) The groups listed below should **not** receive varicella vaccine *except* as specified in the box. Please consult the package insert for a full list of contraindications and precautions.

   - Infants less than 12 months of age.
   - Pregnant women. (Women should avoid getting pregnant until ≥ 1 month after vaccination.)
   - Those with anaphylactic reaction to neomycin or other vaccine component (consult package insert).
   - Those on salicylate (aspirin) therapy, due to the risk of Reye syndrome. (If varicella vaccine has been given, salicylate (aspirin) therapy should be deferred for ≥6 weeks.)
   - Those with severe illness at the time of the scheduled vaccination (temporary contraindication).
   - Those with immunocompromising conditions, including malignancies, primary or acquired immunodeficiency, and immunosuppressive therapy, **except** as noted in box below.

Groups with Potentially Immunocompromising Conditions
Eligible to Receive Varicella Vaccine

The following persons with immunocompromising conditions are **eligible** to be considered for routine varicella immunization. However, varicella vaccine should **not** be used as post-exposure prophylaxis for these persons. If exposed, they should receive VZIG as soon as possible if within 96 hours of exposure.

- Persons with impaired humoral immunity, e.g. hypogammaglobulinemia, dysgammaglobulinemia.
- HIV-infected children in CDC Class N1 or A1 with age-specific CD4+ T-lymphocyte percentages of ≥ 25%. (If to be vaccinated, these children should receive 2 doses with a 3-month interval between doses and be monitored for adverse events. These children may have a higher risk of developing a vaccine-associated rash.)
- Children with acute lymphoblastic leukemia (ALL) in remission for at least 12 consecutive months and conforming to certain other criteria. (Vaccine available through a research protocol. Healthcare providers must call 215-283-0897.)
- Persons on non-suppressive topical, aerosol, or local injections of steroids.
- Persons receiving systemic steroids and who are not otherwise immunocompromised, if they are receiving < 2 mg/kg of body weight or a total of ≤ 20 mg/day of prednisone or its equivalent. (Persons on higher-dose steroid therapy can **not** receive varicella vaccine—see section on steroids below.)

- Those having received blood products (except washed red blood cells), plasma, or immune globulin, including VZIG, within the previous 3-11 months. (Please refer to Attachment C.) The effect of administration of immune globulin on the antibody response to varicella vaccine is not known. Because of potential inhibition of the response, varicella vaccine should not be administered **after** receipt of an immune globulin preparation or a blood product (except washed red blood cells), as recommended for measles vaccine. In addition, varicella vaccine should be given ≥ 2 weeks **before** these blood products. If IG or a blood product is given during this 2-week interval, the individual should be reimmunized after the appropriate interval, as specified in Attachment C, or tested for varicella immunity at that time and reimmunized if seronegative.

2) Guidelines for administration of live virus vaccines to individuals on steroid therapy:

Steroid therapy	**Recommendations for deferral**
High-dose systemic steroids daily or on alternate days for ≥ 14 days (≥ 2 mg/kg QD or ≥ 20 mg QD of prednisone)	Defer live virus vaccines for ≥ 1 month after treatment has stopped.
High dose systemic steroids daily or on alternate days for < 14 days (≥ 2 mg/kg QD or ≥ 20 mg QD of prednisone)	Can give live virus vaccines immediately after treatment has been discontinued. However, some experts recommend deferring until 2 weeks after treatment has stopped, if possible.
Low or moderate doses of systemic steroids given daily or on alternate days (< 2 mg/kg QD or < 20 mg QD of prednisone)	Can give live virus vaccines on treatment.
Topical, aerosol, or local injections of steroids (e.g. skin, aerosol, eyes, inter-articular, bursal, tendon injections); or physiologic maintenance doses of steroid (replacement therapy)	Can give live virus vaccines on treatment. However, if this therapy is prolonged and there is any clinical or laboratory evidence of immunosuppression, defer for ≥ 1 month after treatment has stopped.
Children with a disease which in itself is considered to suppress the immune response and who are receiving systemic or locally acting steroids	Should not give live virus vaccines, except in special circumstances.

Please note that women who are breast feeding and contacts of those with who are immunocompromised may be vaccinated against varicella in accordance with Advisory Committee on Immunization Practices (ACIP) guidelines.